The impact of sexual orientation on body image, self-esteem, urinary and sexual function in the experience of prostate cancer

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Introduction and background

Prostate cancer (PCa) poses a large health burden in men and is the most commonly diagnosed cancer in Australian men. PCa is also projected to remain the most common type of cancer diagnosed in males until at least 2020, with epidemiological data suggesting the vast majority (95%) of men with PCa will survive for at least five years following diagnosis (Prostate Cancer Statistics, 2016).

The range of psychological issues associated with PCa includes changes to identity, self-esteem and body image. The experience of PCa can cause disruption to, and the renegotiation of, an embodied masculine identity, which places the affected individual at risk of social, physical, and emotional injury (Wenger, 2013). PCa also evokes worry and anxiety in regard to the quintessential construct of masculinity (Cayless, Forbat, Illingworth, Hubbard, &

Kearney, 2010), which relates to the altered perception of self. Anxiety and depression are acknowledged as important negative effects of homophobia and heterosexism influencing the mental health of non-heterosexual people (Corboz et al., 2008).

Following treatment for PCa, individuals face substantial challenges to their quality of life (QoL). (Chipman et al., 2014; Litwin et al., 2007a; Loeb et al., 2016; Wootten et al., 2007; Zelefsky et al., 2016). QoL stems from satisfaction or dissatisfaction with the areas of life that are important to oneself (Ferrans, 1996). The potential for major changes to a person's appearance and physical integrity following cancer treatment suggests that body image should be an important end point in QoL evaluation. While the body image of men with PCa has been explored only to a limited extent, there is evidence for a meaningful, negative association between body image dissatisfaction and QoL in PCa survivors (Harrington & Badger, 2009; Taylor-Ford et al., 2013).

The influence of sexual orientation on the experience of PCa, as well as the subsequent impact on QoL, body image, and self-concept has only recently been examined (Hart et al., 2014b; Rosser et al., 2016; Thomas 2013b; Torbit et al 2015). For example, a study examining body image reported that gay (homosexual) men are more prone to body dissatisfaction than straight (heterosexual) men (Hunt, Gonsalkorale, & Nosek, 2012). Gay men in Western culture are likely to succumb to body-based concerns due to the predominant visual and aesthetic orientation of gay culture (Drummond, 2006). Surrender to such concerns is present in older gay men, who also face added challenges with respect to body image, which can affect body identity, masculine identity and self-esteem (Drummond, 2006).

Aims

The current literature indicates that gay men diagnosed with prostate cancer (PCaDx) feel an altered sense of gay identity, which can remain problematic for many years (Kleinmann et al., 2012; Thomas et al., 2013b). To better understand the relationship between this altered sense of self and the psychological outcomes associated with PCaDx was the purpose of the present study. Our study therefore aimed to determine whether:

- gay men would report differences in body image, self-esteem, urinary function and sexual function compared with straight men, regardless of PCaDx (King et al., 2015; Rosser et al., 2016)

- men with PCaDx would report differences in body image, urinary function, sexual function and self-esteem, compared with men without a PCaDx, regardless of sexual orientation (Ussher et al., 2016a)
- there was a statistical interaction between sexual orientation and PCaDx with respect to body image, self-esteem, urinary function and sexual function following a PCaDx diagnosis that is, are differences in body image and other variables greater between gay and straight men with PCaDx than between gay and straight men without PCaDx?
- there was a difference in the number of gay and straight men having a particular PCa treatment modality.

Methods

Participants

Of the 813 study participants, 259 were gay men — 28 gay men with PCaDx (mean age = 64.5, standard deviation [SD] = 7.0, and 231 gay men with no PCaDx (mean age = 46.8, SD = 11.3) — and 554 were straight men (227 straight men with PCaDx, mean age = 66.4, SD = 8.3, and 327 straight men with no PCaDx, mean age = 49.9, SD = 12.3). All participants were aged 30 years and older and were residents of Australia. Each participant self-identified his sexual orientation (gay or straight) and self-reported his PCa diagnosis (with or without PCaDx). Data from 19 respondents who self-identified as bisexual were excluded from analysis, due to the small sample size.

Procedure

Initial respondents were sourced through the email contact list of the study coordinator, social media (for example, Facebook) and word of mouth. Participants were encouraged to invite friends and other potential participants to also complete the questionnaire (available at <http://goo.gl/uhLro>). The Prostate Cancer Foundation of Australia (PCFA), although financially independent of the study, assisted in recruiting participants by emailing coordinators of all the PCa support groups throughout Australia to encourage engagement with this study. Recruitment occurred between 1 July 2013 and 30 September 2013. The response rate is unknown as the nature of recruitment and the number of emails sent to potential respondents were not recorded. Participation was voluntary and consent was implied by submission of the questionnaire. Responses were anonymous, with no identifying

information collected. The study protocol was approved by the La Trobe University Human Ethics Committee.

Treatment type - modality

PCa treatment modalities comprise a heterogeneous group which includes surgery, radiotherapy, androgen deprivation, chemotherapy, brachytherapy, ultrasound and cryotherapy. Rather than comparing participants solely by the presence or absence of a PCaDx, the severity of treatment modality must be taken into account.

As some respondents inadvertently indicated multiple primary modalities of treatment, analyses were restricted to only those participants responding with a single primary modality. The composition of the patient groups, as defined by sexual orientation, PCaDx and primary modality of treatment is shown below in Figure 1.

Figure 1: Summary of participants

Outcome measures

The web-based questionnaire included the demographics of age and primary treatment for PCa, together with self-assessment on four scales — body image, self-esteem, sexual

function and urinary function. Each participant completed a questionnaire and submitted it via SurveyMonkey.

In our study, six variable outcomes — urinary function, sexual function and self-esteem, and three components of body image (appearance evaluation, health evaluation and health orientation, all of which contribute significantly to one's sense of general wellbeing) — were examined. We anticipated that these six measures would clarify the role of sexual orientation with regard to a sense of wellbeing following a PCaDx. Score ranges for the variables of the study are appearance evaluation [1–5], health evaluation [1–5], health orientation [1–5], self-esteem [0–30], urinary function [0–100] and sexual function [0–100].

Urinary and sexual function

Urinary and sexual function were assessed using the Expanded Prostate Cancer Index Composite (EPIC), which has been validated in men with localised PCa following surgery and other treatments including external beam radiation or brachytherapy (with or without the use of androgen deprivation therapy (ADT). EPIC provides a comprehensive assessment of health-related quality of life (HRQoL) among men with PCa (Wei, Dunn, Litwin, 2000), although the clinical relevance of domain score thresholds remains to be defined (Skolarus et al., 2015).

Self-esteem

In lieu of a validated measure of wellbeing in gay men, a commonly used instrument — the Rosenberg Self-Esteem Inventory (RSEI), sometimes referred to as the Rosenberg Self-Esteem Scale (RSES) — was employed in the current study (Rosenberg self esteem scale). In the RSEI, self-esteem as a social construct is described as the overall evaluation of one's worth, value or importance. Within the possible cumulative scale ranging between 0 and 30, a score less than 15 suggests low self-esteem; a score between 15 and 25 is considered to be within normal range; and a score greater than 25 indicates higher self-esteem (Pelham & Swann, 1989).

Body image

Body image was assessed using the Multidimensional Body-Self Relations Questionnaire (MBSRQ), a self-report inventory for assessing self-attitudinal aspects of the body-image construct (Cash, 2000). The MBSRQ has seven factor subscales, only three of which were considered appropriate to administer to a cohort of men regardless of their PCaDx status. The

three subscales — appearance evaluation, health evaluation and health orientation — are defined below (Cash, 2000):

Appearance evaluation: This scale measures feelings of physical attractiveness or unattractiveness, and satisfaction or dissatisfaction with one's looks. High scorers feel mostly positive and satisfied with their appearance, while low scorers have a general unhappiness with their physical appearance.

Health evaluation: This scale measures feelings of physical health and/or the freedom from physical illness. High scorers feel their bodies are in good health, while low scorers feel unhealthy and experience bodily symptoms of illness or vulnerability to illness.

Health orientation: This scale measures the extent of investment in a physically healthy lifestyle. High scorers are "health conscious" and try to lead a healthy lifestyle, while low scorers are more "*indifferent to their health*" (Cash, 2000).

Body image is represented by the individual scores from the appearance evaluation, health evaluation and health orientation sub-scales as described above. As the MBSRQ is a multidimensional assessment, the sub-scale scores cannot be combined into a single measure but must be evaluated individually (Cash, 2000).

Statistical analysis

All outcome measures were visually inspected to check for possible violation of normality and for possible outliers. As discussed below, there were statistically significant differences in 'age at time of study' between the groups and so age was included in the analytic models. The primary treatment modality (1^oTx) was compared, adjusting for age, between gay and straight men with PCaDx.

As some respondents inadvertently indicated multiple primary modalities of treatment, analysis of treatment modality was restricted to only those participants responding with a single primary modality. Due to small numbers for a primary modality other than surgery for gay men, Fisher's exact test was performed throughout.

Two-way (two factor) analysis of covariance (ANCOVA) (Cohen et al, 2003; Howell 2010) was conducted with age at time of study as a covariate, examining the main effect of two factors: sexual orientation (that is, gay men versus straight men, irrespective of PCa diagnosis (PCaDx) status) and PCaDx status (that is, men with PCaDx versus men without PCaDx,

irrespective of sexual orientation). ANCOVA also allowed for the examination of possible statistical interactions between sexual orientation and PCaDx status (that is, whether the difference on outcome measures between gay and straight men was a function of PCaDx status).

A one-way ANCOVA, with age at time of study as covariate, was conducted to compare gay men with PCaDx and straight men with PCaDx, on age at cancer diagnosis and Gleason score, these variables being irrelevant to men without PCaDx.

All statistical analyses were performed using IBM SPSS version 24 (IBM Corporation, New York, 2016).

In line with contemporary practice (Cumming & Calin-Jageman, 2016), the magnitude as well as the statistical significance of a result (such as the difference between group means) should be considered when interpreting the results.

Importantly, a small change (such as one relating to sexual function) may be important to PCa patients but may nonetheless lack clinical relevance to their providers (Skolarus et al., 2015; Make, 2007; Skolarus et al, 2015). A commonly employed measure of the clinical magnitude of the result is the minimal clinically important difference (MCID) (King, 2011). For the EPIC, Skolarus et al. found that the bowel and vitality/hormonal domains had an MCID ranging from 4 to 6 and so a 4–6 point change or difference in means should be considered clinically relevant. The sexual domain had the greatest MCID values (10–12), while urinary incontinence had the smallest MCID range (6–9) (Make, 2007; Skolarus et al., 2015). However, for the other tests of the study, the Rosenberg self-esteem scale and the Multidimensional Body-self relations questionnaire (MBSRQ (Cash, 2000), the MCID is currently unknown.

Results

-----[Insert Table 1] here -----

Table 1 shows that gay participants with PCaDx were more likely to have surgery (72.7%) as 1⁰Tx, compared with straight men with PCaDx (67.9%), although this difference was not statistically significant ($p = 0.81$).

There was a statistically significant difference between gay and straight men with regard to brachytherapy as 1⁰Tx (40.9% vs. 4.7%, $p < 0.001$), while the difference in ultrasound / cryotherapy / other treatment approached statistical significance (9.1% vs. 1.0%, $p = 0.053$).

It can be seen, however, that the modality frequencies of 1⁰Tx apart from surgery for gay men were very low, ranging from $n = 5$ for active surveillance to $n = 0$ for hormone therapy treatment. Consequently, statistical analyses were confined to those with a PCaDx and 1⁰Tx of surgery only. Those men having a PCaDx without a primary treatment modality of surgery were excluded from further analyses.

----- XX Insert Table 2 here -----

Table 2 above shows the main effects of PCaDx status and sexual orientation overall.

Age

As can be seen in the first five columns of Table 2, regardless of sexual orientation, all participants with PCaDx and treatment modality of surgery were significantly older (mean age = 65.7, SD = 18.0), compared with all participants without PCaDx (mean age = 48.4, SD = 11.4). The difference between means was 17.33 (95% CI = 14.27 to 20.39), which was statistically significant, ($p < 0.001$).

Self-esteem

As can be seen in the latter four columns of Table 2, regardless of PCaDx status, gay participants had a slightly higher age-adjusted mean self-esteem score (16.7, SD = 3.7) than straight participants (16.1, SD = 2.2) and this difference was statistically significant (difference between means = 0.57, 95% CI = 0.06 to 1.09, $p = 0.03$). As discussed earlier, no MCID (minimal clinically important difference) is yet available for the Rosenberg Self-esteem Scale.

Urinary and sexual function

The first two columns of Table 2 show a statistically significant difference between participants with PCaDx and 1⁰Tx of surgery and participants without PCaDx on urinary function score ($p = 0.029$), sexual function score ($p < 0.001$) and health orientation ($p = 0.02$).

Participants with PCaDx and 1⁰Tx of surgery (column 1) had a lower mean urinary function score than participants without PCaDx (column 2) (difference between means = -3.7, 95% CI

= -7.0 to -0.4). However, this difference is lower than the minimally clinically important difference (MCID) of 6 to 9 as suggested by Skolarus (Skolarus et al, 2015).

Participants with a PCaDx and 1⁰Tx (a primary treatment modality of surgery) had a lower mean sexual function score than men without PCaDx (difference between means = -29.96, 95% CI = -35.37 to -24.56). This difference is substantially higher than the MCID of 10 to 12, suggesting the alteration in sexual function for those with PCaDx and a 1⁰Tx of surgery is a clinically relevant and important change. (Skolarus et al, 2015).

Health orientation

Finally, it can be seen in Table 2 that participants with PCaDx and 1⁰Tx of surgery had a slightly higher mean health orientation score (3.8, SD = 1.0) than participants without a PCaDx (3.6, SD = 0.6). The difference between means was 0.21 (95% CI = 0.04 to 0.39), which was statistically significant (p = 0.02). As discussed earlier, the MID values for the Cash scales are not available and therefore the clinical relevance of this result remains uncertain.

Sexual orientation and PCaDx status

----- XX Insert Table 3 here -----

Table 3 shows the results for tests of statistical interaction between sexual orientation and PCaDx status. No statistically significant interactions (Table 3) between sexual orientation and PCaDx status were noted in the case of age, self-esteem, sexual function scores, health evaluation, health orientation and appearance evaluation.

The interaction between sexual orientation and PCaDx status for urinary function narrowly failed to approach statistical significance (p=0.054). The mean age-adjusted urinary function score was slightly higher in gay men with PCaDx and 1⁰Tx of surgery (89.9), compared with that of straight men with PCaDx and 1⁰Tx of surgery (85.9).

However, gay participants without PCaDx had a slightly lower mean urinary function score (90.6) than straight men without PCaDx (92.6). Both differences in means are lower than the minimal clinically important difference (MCID) of 6 to 9 (Skolarus et al, 2015).

Gay participants with PCaDx and 1⁰Tx of surgery had a marginally higher mean age at diagnosis (61.0, SD = 3.7) than straight participants with PCaDx and 1⁰Tx of surgery (60.2, SD = 3.7), however the difference between means (0.79, 95% CI = -1.1 to 2.74) was clearly

not statistically significant ($p = 0.42$). Gay participants with PCaDx and 1⁰Tx of surgery had a lower mean Gleason score (6.7, SD = 1.1) than straight participants with PCaDx and 1⁰Tx of surgery (6.9, SD = 1.1), however the difference between means (-0.2, 95% CI = -0.9 to 0.4) was also not statistically significant ($p = 0.51$).

Discussion

In our study, we investigated the relationship between sexual orientation and PCa diagnosis (PCaDx) with regard to self-esteem, body image, urinary function and sexual function in Australian men.

Although not statistically significant, it was interesting to note that for self-esteem, gay men scored slightly higher than did straight men. There were overall statistically significant differences in sexual and urinary functioning of men with and without PCaDx. There was also a statistically significant difference in health-orientation, for which men with PCaDx and 1⁰Tx of surgery scored slightly higher than men without PCaDx.

Differences between the presence and absence of PCaDx were not greater for gay men than for straight men, except in relation to urinary function score. The latter difference appeared larger between gay and straight men with PCaDx, and positive (higher for gay men than for straight men) than for gay and straight men without PCaDx, while the latter difference was negative (higher for straight men than for gay men). The test for statistical interaction between sexual orientation and PCaDx approached, but did not achieve, statistical significance ($p=0.054$).

The findings of the present study are counterintuitive to the research literature of gay sexuality in other health contexts where depression in gay men with PCa was found to be higher than in the population norms (Hart, Coon, Kowalkowski, & Latini, 2011). For gay men, the additional burden of a PCaDx may increase these psychological effects, resulting in lower self-esteem and body image outcomes. However, the present findings show no statistically significant difference between gay men with PCa and straight men with PCa with respect to self-esteem, appearance evaluation, health evaluation and body image.

The present findings are consistent with the literature where differences in the urinary and sexual function of men with and without PCaDx have been reported (Clark et al., 2003; Litwin et al., 1995b). Hart has suggested that studies of health outcomes in relation to PCa

and sexual orientation should entail a treatment-matched sample of gay and straight men, with such a study providing an important contribution to research in this area. (Hart et al., 2014c). Such a treatment-matched sample was investigated in our study with respect to the 1⁰Tx of surgery. However, insufficient participant numbers having a matched primary treatment modality other than surgery made further analysis impossible.

The absence of a statistically significant difference in self-esteem between gay and straight men with and without PCa, or between gay men with cancer and straight men with cancer was an interesting finding. Such a result may suggest that the seriousness of a PCaDx and associated prognosis might permit socially imposed life stressors (such as discrimination concerning gay sexual orientation: homophobia and hetero-sexism) to be cast aside. This in turn might allow a focus on the more important issue of one's own health and psychological wellbeing. Such a concept is in keeping with that of 'post-traumatic growth', where intrusive thoughts are moderated and an individual assigns positive meaning in cancer survivorship (Park 2010). Research has found that while many men report a diagnosis of PCa has significantly affected their lives, some individuals have gained a positive perspective and adopted a sense of empowerment following such a diagnosis (Thomas 2013b).

Although issues of health disparity associated with sexual orientation concerning a PCaDx have received little attention to date, recent research suggests that differences do exist (Blank, 2005; Kleinmann et al., 2012; Ussher, Perz, Rose, et al., 2016a).

For example, an earlier systematic review (Thomas, Wootten, & Robinson, 2013a), which considered the question of how the PCaDx affects the quality of life of gay men (Thomas, Wootten, & Robinson, 2013a), resulted in four relevant papers (Filiault, Drummond, & Smith, 2008; Hart, Latini, Cowan, & Carroll, 2008a; Thomas et al., 2013a; Zhang, Hart, & Latini, 2010). The research was concerned with changes in the sexual roles and quality of life of gay men (or men who have sex with men) after PCa (Dowsett, Lyons, Duncan, & Wassersug, 2014; Hart et al., 2014c; Lee, Breau, & Eapen, 2013). The study by Hart et al., which reported gay men with PCa as having substantial changes in sexual functioning after PCa treatment and also significantly worse disease-specific and general HRQoL, fear of recurrence and less satisfaction with their medical care than other PCa samples, was particularly important (Hart et al., 2014c).

Interestingly our study found no statistically significant difference between gay and straight men with PCaDx and 1⁰Tx of surgery in regard to age at diagnosis and Gleason score.

Limitations and future research

Recruitment via email and Facebook was a potential source of study bias, in that such a method was a barrier to those men unfamiliar with computers. However, such a method was considered appropriate in order to access a large cohort of men without undue cost or time delay. As it is impossible to accurately count the number of gay men in Australia, complete data analysis remains problematic. As the four scales of the questionnaire are self-reported, this may potentially result in favourable bias towards the participant. Future research may do well to employ more than one approach to the recruitment of participants.

Although few men regretted having a radical prostatectomy one year post-treatment, further assessment of the effect on sexual function, sexuality and masculinity requires additional exploration (Davison, So, & Goldenberg, 2007). In our study, decisional regret was not measured due to the desire to maximise responses by not increasing the time taken to complete the questionnaire (which was about 12 minutes).

Our cross-sectional study was designed to investigate the relationship between sexual orientation and PCaDx with regard to self-esteem, body image, urinary function and sexual function in a large cohort of Australian men. Apart from urinary function, which narrowly failed to approach statistical significance, there was clearly no greater difference in measures of body image (appearance evaluation, health evaluation and health orientation), self-esteem and sexual function in gay and straight men with PCa, compared with gay and straight men without PCa.

These findings are in conflict with the research literature of gay sexuality, where it has been concluded that gay men may be vulnerable to decrements in HRQoL following PCa treatment. (Hart et al., 2011b) compared with straight men. However, our exploratory study may well be limited by the small sample size of gay men with a PCaDx and 1⁰Tx of surgery (n = 16) and straight men with PCaDx and 1⁰Tx of surgery (n = 131) and so may have insufficient power to detect statistically significant effects. Our study findings were obtained from primarily Caucasian men in Australia and may not be generalisable to men in other countries, ethnicities and cultures (such as Indigenous Australians). Globally different health systems and laws concerning gay sexual practice may influence the self-esteem and body image outcomes investigated in this study. The cross-sectional nature of the study, the self-selected nature of the sample, the range of post-treatment periods, the type of treatment

undertaken and the wide age range of those with PCaDx were further limitations of the study.

Conclusion

Our study investigated the influence of sexual orientation on the experience of PCa. This was achieved by assessing the body image, self-esteem, urinary function and sexual function of gay and straight men with and without a PCaDx. The present findings provide insight into the wellbeing of both gay and straight men with PCa. Higher urinary function was associated with a PCaDx in gay men with a 1^oTx of surgery than gay men without PCaDx, the opposite pattern to that found for straight men with and without PCaDx, although the result only approached statistical significance. This indication, and the lack of any other statistical interaction between sexual orientation and PCa, was an unexpected but important finding which provides baseline information in the emerging research area of PCa and sexual orientation.

The areas of difference — between gay and straight men with and without PCa including a non-significant trend towards higher urinary function associated with a PCaDx in gay men — provide an opportunity for more-focused counselling in the future. Further exploration of this topic requires sustainable intervention studies which are currently absent from the literature (Latini, Hart, Coon, & Knight, 2009).

Our study identified differences with respect to PCaDx, regardless of sexual orientation.

For those with a PCaDx, conflicting results exist concerning QoL according to sexual orientation (Hart et al 2011b; Hart et al 2014c). This outcome disparity might be accounted for by considering the possible differences within the study populations, where variations according to ethnicity, culture, study population size, health care system of the country in which the study was conducted, and other demographics such as age at diagnosis, and type of prostate cancer treatment(s) undertaken will all have a bearing on the QoL results.

Our results indicate that in clinical practice physicians and other health professionals (mental health workers) must remain mindful to ensure that more-targeted counselling is available to meet the needs of each patient regardless of sexual orientation.

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Tables

Table 1: Comparison of sexual orientation and the number of participants having a particular primary treatment for PCa (adjusted for age)

Available data for primary treatment by sexual orientation	Surgery only	Active surveillance only	Hormone therapy only	Radiotherapy only	Brachytherapy only	Ultrasound / cryotherapy / other only
22 gay	n=16 ^{##} (72.7%)	n=5 (22.7%)	n=0 (0%)	n=0 (0%)	n=9 (40.9%)	n=2 (9.1%)
193 straight	n=131 [^] (67.9%)	n=27 (14.0%)	n=18 (9.3%)	n=6 (3.1%)	n=9 (4.7%)	n=2 (1.0%)
	p=0.81	p=0.34	p=0.22	p>0.999	p<0.001	p=0.053

1⁰Tx = Primary modality of treatment

^{##} All gay participants with available data (n=22), and having surgery alone as primary treatment modality (1⁰Tx) n=16, 16/22x100=72.7%

[^] All the straight participants with available data (n=193), and having surgery alone as primary treatment modality (1⁰Tx) n=131 131/193x100= 67.9%

Table 2: Comparison of participants by sexual orientation, PCaDx status and primary treatment modality of surgery

	All participants with PCaDx and 1 ⁰ Tx modality of surgery n= [147]	All participants without PCaDx n = [558]			All gay participants n = [247]	All straight participants n = [458]		
	Mean (SD) ¹	Mean (SD)	Difference between means [95% CI]	p value	Mean (SD)	Mean (SD)	Difference between means [95% CI]	p value
Current age (years)	65.7 (18.0)	48.4 (11.4)	17.33 [14.27 to 20.39]	< 0.001	56.2 (22.7)	57.8 (12.4)	-1.63 [-4.69 to 1.43]	0.30
Self-esteem score	16.5 (3.2)	16.4 (2.0)	0.12 [-0.44 to 0.67]	0.68	16.7 (3.7)	16.1 (2.2)	0.57 [0.06 to 1.09]	0.03
Urinary function score	87.9 (18.7)	91.6 (11.8)	-3.71 [-7.03 to -0.39]	0.029	90.2 (22.2)	89.3 (13.0)	0.96 [-2.10 to 4.01]	0.54
Sexual function score	40.0 (30.1)	69.9 (19.1)	-29.96 [-35.37 to -24.56]	0.001	54.8 (36.0)	55.1 (21.0)	-0.28 [-5.25 to 4.69]	0.91
Body image								
Health evaluation	3.7 (1.2)	3.8 (0.8)	-0.06 [-0.28 to 0.15]	0.57	3.7 (1.4)	3.8 (0.8)	-0.09 [-0.28 to 0.12]	0.41
Health orientation	3.8 (1.0)	3.6 (0.6)	0.21 [0.04 to 0.39]	0.02	3.8 (1.2)	3.7 (0.7)	0.11 [-0.06 to 0.27]	0.20
Appearance evaluation	3.4 (1.3)	3.3 (0.8)	0.07 [-0.16 to -0.30]	0.54	3.3 (1.5)	3.3 (0.8)	-0.02 [-0.23 to 0.19]	0.86

SD = standard deviation CI = confidence interval PCaDx = prostate cancer diagnosis 1⁰Tx = primary treatment modality

¹ All means, standard deviations and differences between means, apart from those for age itself, are predicted or estimated after controlling for age.

Table 3: Comparison of all participants with and without PCaDx and all participants with and without the combination of PCaDx and primary 1⁰Tx of surgery

	All gay with PCaDx and modality of surgery [n=16]	All straight with PCaDx and modality of surgery [n=131]		All gay without PCaDx [n=231]	All straight without PCaDx [n=327]		
	Mean ¹ (SD)	Mean (SD)	Difference between means	Mean (SD)	Mean (SD)	Difference between means	P value

			[95% CI]			[95% CI]	
Current age (years)	65.6 (11.2)	65.8 (14.9)	-0.15 [-5.97 to 5.68]	46.8 (8.4)	49.9 (11.2)	-3.12 (-5.01 to -1.23)	0.34
Self-esteem score	16.9 (1.9)	16.0 (2.1)	0.88 [-0.09 to 1.85]	16.5 (1.9)	16.2 (1.9)	0.26 (-0.06 to 0.52)	0.24
Urinary function score	89.9 (11.3)	85.9 (12.5)	3.97 [-1.83 to 9.76]	90.6 (11.6)	92.6 (11.2)	-2.05 (-4.01 to -0.10)	0.054
Sexual function score	41.1 (18.4)	38.8 (20.3)	2.29 [-7.14 to 11.71]	68.5 (18.8)	71.4 (18.2)	-2.85 (-6.02 to 0.33)	0.31
Appearance evaluation	3.4 (0.8)	3.3 (0.9)	0.11 [-0.29 to 0.51]	3.2 (0.8)	3.4 (0.8)	-0.15 (-0.29 to -0.02)	0.22
Health evaluation	3.7 (0.8)	3.7 (0.9)	0.02 [-0.36 to 0.39]	3.7 (0.8)	3.8 (0.8)	-0.19 (-0.31 to 0.06)	0.31
Health orientation	3.9 (0.8)	3.7 (0.9)	0.22 [-0.09 to 0.53]	3.6 (0.8)	3.6 (0.8)	-0.01 (-0.11 to 0.10)	0.16
Age at PCaDx	61.0 (3.7)	60.2 (3.7)	0.79 [-1.1 to 2.74]	NA	NA	NA	0.42
Gleason score	6.7 (1.1)	6.9 (1.1)	-0.2 [-0.9 to 0.4]	NA	NA	NA	0.51

CI = confidence interval

PCaDx = prostate cancer diagnosis 1⁰Tx = primary treatment modality

¹ All means, standard deviations and differences between means, apart from those for age itself, are predicted or estimated after controlling for age.

Table 1: Comparison of sexual orientation and the number of participants having a particular primary treatment for PCa (adjusted for age)

Available data for primary treatment by sexual orientation	Surgery only	Active surveillance only	Hormone therapy only	Radiotherapy only	Brachytherapy only	Ultrasound / cryotherapy / other only
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193 straight	n=131 [^] (67.9%)	n=27 (14.0%)	n=18 (9.3%)	n=6 (3.1%)	n=9 (4.7%)	n=2 (1.0%)
	p=0.81	p=0.34	p=0.22	p>0.999	p<0.001	p=0.053

1⁰Tx = Primary modality of treatment

^{##} All gay participants with available data (n=22), and having surgery alone as primary treatment modality (1⁰Tx) (n=16)

[^] All the straight participants with available data (n=193), and having surgery alone as primary treatment modality (1⁰Tx) (n=131)

	All Gay with PCaDx [n=28]	All Straight with PCaDx [n=227]	All Gay without PCaDx	All Straight without PCaDx	
	Mean ¹ (95% CI)	Mean (95% CI)	Mean (95% CI)	Mean (95% CI)	Interaction P value
Current age (years)	64.5 [60.5 to 68.5]	66.5 [65.1 to 67.9]	46.8 [45.4 to 48.2]	49.9 [48.7 to 51.1]	0.63
Age at diagnosis (years)	61.7 [60.3 to 63.2]	60.5 [59.9 to 61.0]	NA	NA	NA
Gleason Score	6.5 [6.0 to 7.1]	6.9 [6.7 to 7.1]	NA	NA	NA
Self esteem score	16.7 [16.0 to 17.4]	16.1 [15.9 to 16.4]	16.5 [16.2 to 16.7]	16.2 [16.0 to 16.4]	0.52
Urinary function score	86.3 [81.9 to 90.7]	86.2 [84.4 to 88.0]	90.4 [88.8 to 92.0]	92.4 [91.1 to 93.7]	0.41
Sexual function score	43.1 [35.7 to 50.4]	40.1 [37.1 to 43.0]	67.6 [65.0 to 70.3]	70.4 [68.2 to 72.6]	0.17
Appearance evaluation	3.4 [3.1 to 3.7]	3.3 [3.2 to 3.4]	3.2 [3.1 to 3.4]	3.4 [3.3 to 3.5]	0.10
Health evaluation	3.6 [3.4 to 3.9]	3.6 [3.5 to 3.7]	3.7 [3.6 to 3.8]	3.8 [3.8 to 3.9]	0.22
Health orientation	4.0 [3.7 to 4.2]	3.7 [3.6 to 3.8]	3.6 [3.5 to 3.7]	3.6 [3.6 to 3.7]	0.06
Post high school/secondary education	0.7 [0.5 to 0.8]	0.8 [0.7 to 0.8]	0.9 [0.8 to 0.9]	0.8 [0.8 to 0.9]	0.06

Table 2 Comparison of all gay participants with and without PCaDx and all straight participants with and without PCaDx

¹ All means, apart from those for age itself, are predicted or estimated after controlling for age, and so are presented along with 95% confidence intervals.

CI = 95% Confidence Interval, PCaDx= prostate cancer diagnosis

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Table 3: Comparison of all participants with and without PCaDx and all participants with and without the combination of PCaDx and primary 1⁰ Tx of surgery

	All gay with PCaDx and modality of surgery [n=16]	All straight with PCaDx and modality of surgery [n=131]		All gay without PCaDx [n=231]	All straight without PCaDx [n=327]		
	Mean ¹ (SD)	Mean (SD)	Difference between means [95% CI]	Mean (SD)	Mean (SD)	Difference between means [95% CI]	P value
Current age (years)	65.6 (11.2)	65.8 (14.9)	-0.15 [-5.97 to 5.68]	46.8 (8.4)	49.9 (11.2)	-3.12 (-5.01 to -1.23)	0.34
Self-esteem score	16.9 (1.9)	16.0 (2.1)	0.88 [-0.09 to 1.85]	16.5 (1.9)	16.2 (1.9)	0.26 (-0.06 to 0.52)	0.24
Urinary function score	89.9 (11.3)	85.9 (12.5)	3.97 [-1.83 to 9.76]	90.6 (11.6)	92.6 (11.2)	-2.05 (-4.01 to -0.10)	0.054
Sexual function score	41.1 (18.4)	38.8 (20.3)	2.29 [-7.14 to 11.71]	68.5 (18.8)	71.4 (18.2)	-2.85 (-6.02 to 0.33)	0.31
Appearance evaluation	3.4 (0.8)	3.3 (0.9)	0.11 [-0.29 to 0.51]	3.2 (0.8)	3.4 (0.8)	-0.15 (-0.29 to -0.02)	0.22
Health evaluation	3.7 (0.8)	3.7 (0.9)	0.02 [-0.36 to 0.39]	3.7 (0.8)	3.8 (0.8)	-0.19 (-0.31 to 0.06)	0.31
Health orientation	3.9 (0.8)	3.7 (0.9)	0.22 [-0.09 to 0.53]	3.6 (0.8)	3.6 (0.8)	-0.01 (-0.11 to 0.10)	0.16
Age at PCaDx	61.0 (3.7)	60.2 (3.7)	0.79 [-1.1 to 2.74]	NA	NA	NA	0.42
Gleason score	6.7 (1.1)	6.9 (1.1)	-0.2 [-0.9 to 0.4]	NA	NA	NA	0.51

CI = confidence interval PCaDx = prostate cancer diagnosis 1⁰ Tx = primary treatment modality

¹ All means, standard deviations and differences between means, apart from those for age itself, are predicted or estimated after controlling for age.

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